UIROBOT®
United Intelligence Robot Technology

# User Manual

## UIM2501

## CAN2.0 / RS232

## Control Protocol Converter

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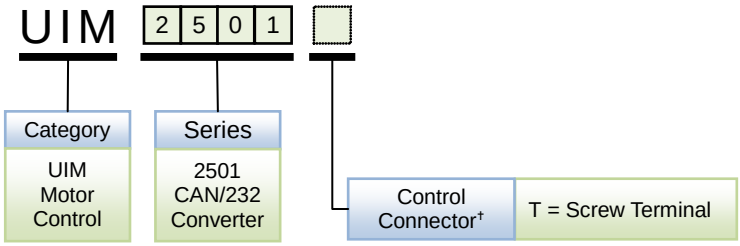
**[UIM2501 Ordering Information]**

In order to serve you quicker and better, please provide the product number in following format:

## UIM2501 PART NUMBERING SYSTEM




Note:† If not selected, default control connector is T (screw terminal), the code box can be deleted.

Examples: UIM2501T, UIM2501

# UIM2501
# CAN/RS232 Control Protocol Converter

**Embedded DSP Microprocessor**

- Embedded high-performance DSP
- Simple, intuitive, rich instructions
- Intelligent, fault-tolerating, user-friend interface
- MS Windows based VB / VC demo software and corresponding source code provided

**RS232 Communication**

- RS232 three wire serial communication
- Max baud rate 57600 bps

**CAN2.0 Active Communication**

- Active CAN 2.0, 2-wire interface
- Support 1M bps, long distance(10km)
- Up to 100 nodes can be connected
- Differential data bus, high noise immunity

**Wide Supply Voltage**

- Wide supply voltage range 6～40VDC

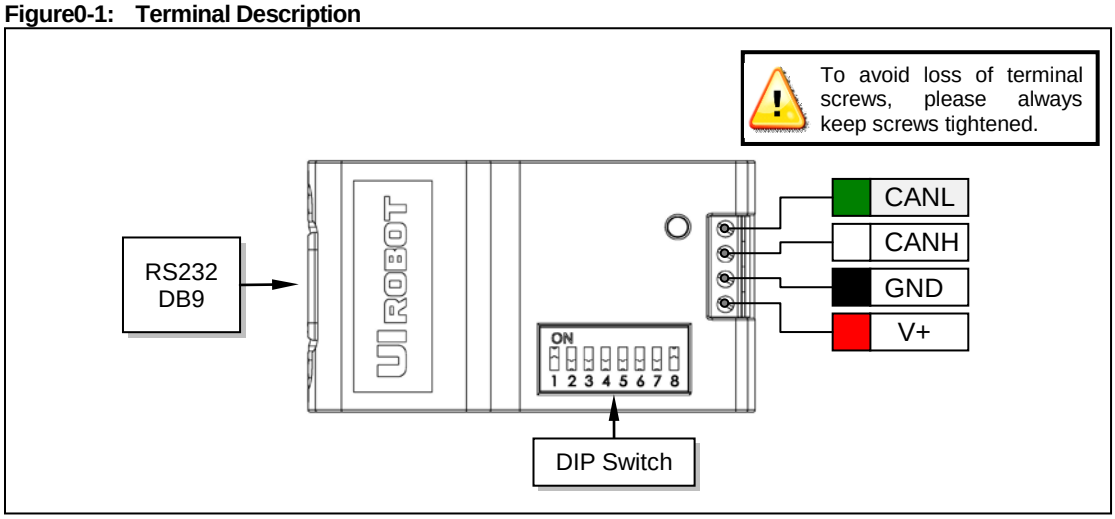
## GENERAL DESCRIPTION

The UIM2501 RS232-CAN Converting Controller is used in conjunction with UIM242XX stepper motor controller to provide a RS232 interface on the user side and a CAN bus interface on the motor side (factory side). With the UIM2501, user will be benefited from the advantages of the CAN network and the simplicity of RS232 protocol, and no need to deal with the complicated CAN protocol, no worry about the communication distance and noise immunity. One UIM2501 controller can network with up to 100 UIM242XX controllers. Interfacing the UIM2501 is simple, intuitive and fault tolerating. Users are not required to have stepper motor driving or CAN protocol knowledge.

UIM2501 is compact in size. The enclosure is made of die-cast aluminum to provide a rugged durable protection and improves the heat dissipation.

# TERMINAL DESCRIPYION

**Figure0-1: Terminal Description**




### Description Screw Terminals

| Terminal No. | Designator | Description |
|---|---|---|
| 1 | V+ | Supply voltage, 6 - 40VDC |
| 2 | GND | Supply voltage ground |
| 3 | CANH | CAN Dominant High |
| 4 | CANL | CAN Dominant Low |

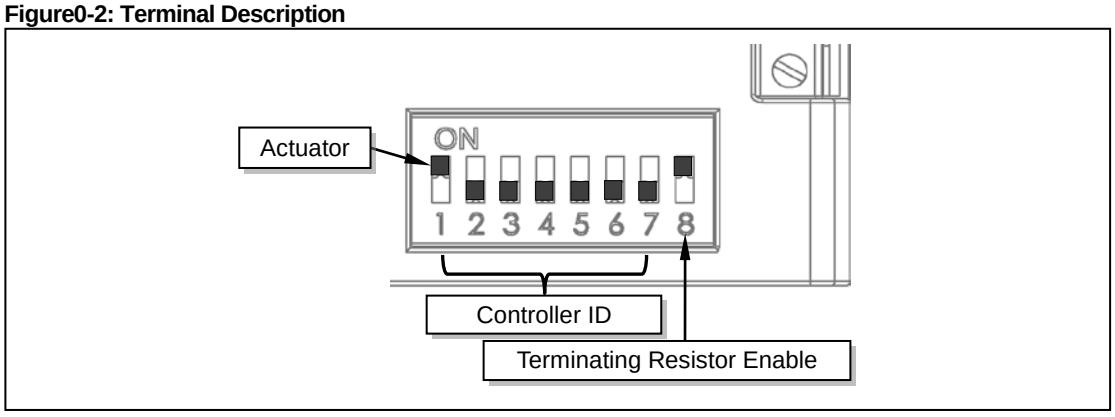
### RS232 Connector

DB-9 (Female Pin) connector, connect to RS232 cable.

# DIP SWITCH

UIM2501 controller has an 8-bit DIP switch, which serves multiple functions. When powering up, DIP1~DIP7 are read as the UIM2501 controller's ID/address. After powering up, DIP1 and DIP2 are assigned to other RS232 related features (refer to the "RS232 communication" section). DIP8 is used to enable the built-in terminating resistor. Unless necessary, please maintain the DIP positions as shown in following Figure.

**Figure0-2: Terminal Description**



## TYPICAL APPLICATION

UIM2501 converter can work with UIM242XX in fowllwing ways: single slave operation and network operation. Single slave operation means one UIM2501 working with one UIM242 or UID820/828, while network operation means one UIM2501 working with a set of UIM242 and UID820/828 in a CAN network. Typical applications are described below.

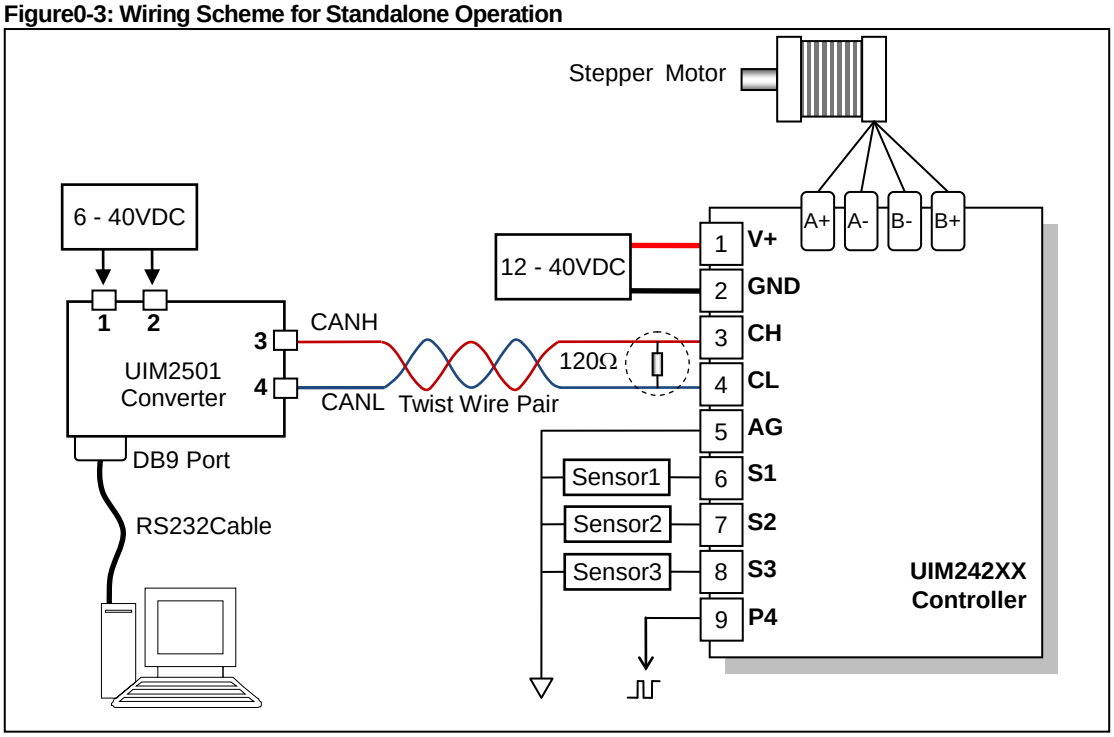
### Single Slave Operation

If only one UIM242 or UID820 is used, following wiring scheme (figure 0-3) can be applied.

Please note that, this wiring scheme is mandatory when assigning a controller ID to a UIM242 controller (motor is not required).

Please note: Both ends of the CAN bus should be terminated with120Ω terminating resistors. As UIM2501 converter has a build-in terminating resistor, user only needs to attach a resistor to the other end of the bus. Furthermore, CANH and CANL should be a twisted wire pair

**Figure0-3: Wiring Scheme for Standalone Operation**



## Network Operation

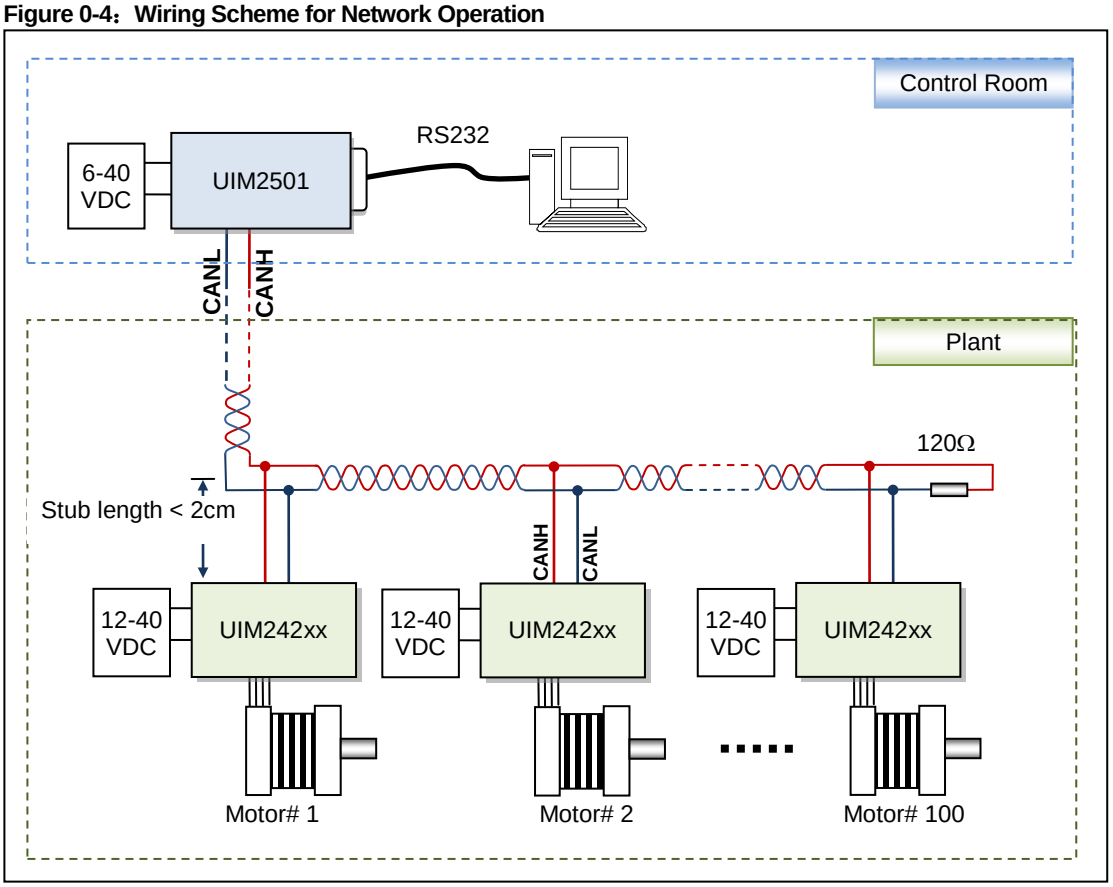
CAN bus provides a reliable and simple network construction scheme.

Figure 0-4 provides a typical network wiring solution. The corresponding relation of UIM2501 and UIM242XX is shown in Figure 0-3.

Please be aware that:

- A single pair of wires should connect each element of the CAN bus.
- A star configuration should never be used.
- Stub length should be shorter than 2cm, and keep these stubs as small as possible.
- The two ends of the bus should be terminated with 120Ω resistors. When the distance is longer than 100m, a specialized 120 ohm impedance shielding twisted-pair cable for CAN bus, should be considered.
- UIM2501 converter has a build-in terminal resistor. User only needs to attach a resistor at the UIM242 end of the bus. To enable the UIM2501 converter's terminating resistor, please toggle the DIP8 to ON position.

**Figure 0-4：Wiring Scheme for Network Operation**



## INSTRUCTION SET SUMMARY

| Instruction | Description | Feedback Header | MessageID | Page |
|---|---|---|---|---|
| ADRη; | Specify the operation object by node ID η | AA | D0 | 18 |
| BDRη; | Set RS232 baud rate η | AA | BD | 19 |
| BTRη; | Set CAN network communication bit rate index | AA | BC | 20 |
| BTR; | Check current CAN network bit rate index | AA | BC | 21 |
| SETη; | Assign an ID | AA | DD | 35 |
| | | | | |
| gACRη; | Set the ACR function of all nodes | AA | AD | 22 |
| gCURη; | Set motor phase current for all nodes | AA | AD | 23 |
| gDOUη; | Set the TTL level output of P4 ports of all nodes | AA | AD | 24 |
| gMCSη; | Set micro-stepping resolution for all nodes | AA | AD | 25 |
| gOFF; | Disable the H-Bridge of all nodes | AA | AD | 26 |
| gORG; | Set Original Point of all nodes | AA | AD | 27 |
| gPOSη; | Setup absolute position control for all nodes | AA | AD | 28 |
| gQECη; | Setup encoder based position control for all nodes | AA | AD | 29 |
| gREGη; | Record the quantity of all subsidiary nodes and IDs | CC | D0 | 30 |
| gSPDη; | Set motor speed for all nodes | AA | AD | 31 |
| gSTPη; | Setup relative position control for all nodes | AA | AD | 32 |
| | | | | |
| MDLη; | Check the Model / Modules / Firmware of node | CC | DE | 34 |
| MDL; | Check the Firmware Version of UIM2501 | CC | DE | 33 |

# CHARACTERISTICS

**Absolute Maximum Ratings (†)**

Supply Voltage..... -0.3V to 40V
Voltage on RX with respect to GND..... -25V to +25V
Voltage on TX with respect to GND..... -13.2V to +13.2V
Ambient temperature under bias..... -20°C to +85°C
Storage temperature..... -50°C to +150°C

†NOTICE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

**Electrical Characteristics (Ambient Temperature 25°C)**

| | |
|---|---|
| Supply Power Voltage | 6V-40VDC |
| Current Consumption | Max 100mA |

**Communication (Ambient Temperature 25°C)**

| | |
|---|---|
| To UIM242 Controller | Active CAN 2.0 |
| CAN wiring Method | 2-Wire, CANH, CANL |
| CAN bus | • Supports 1 Mb/s operation<br>• ISO-11898 standard physical layer requirements<br>• Short circuit protection<br>• High-voltage transient protection<br>• Automatic thermal shutdown protection<br>• Up to 100 nodes can be connected<br>• Differential data bus, high noise immunity |
| To User Device | RS232 |
| Physical Connection | Three-wire: TX、RX、GND |
| RS232 Baud Rate | MAX 57600 bps; Set by instryction, can be reset to 9600 |
| Set Baud Rate | User instruction, toggle the DIP1 ro reset to 9600 |

**Environment Requirements**

| | |
|---|---|
| Cooling | Free air |
| Working environment | Avoid dust, oil mist and corrosive gases |
| Working temperature | -40°C ~ 85°C |
| Humidity | <80%RH，no condensation, no frosting |
| Vibration | 3G Max |
| Storage temperature | -50°C ~ 150°C |
| Size | 66.4mm x 38mm x 18mm (L*W*H) |
| Wight | 0.1 kg |

## Menu

# 1.0 OVERVIEW

UIM2501 RS232-CAN Converting Controller is used in conjunction with UIM242 stepper motor controller to provide a RS232 interface on the user side and a CAN bus interface on the motor controller side.

UIM2501 Controller's functions can be summarized as:

- Receives RS232 based instructions from user device, converts the instructions into more concise and efficient CAN based instructions, and sends instructions to UIM242 controllers.
- Converts CAN messages from UIM242 controllers into RS232 messages, and send back to the user devices.
- Coordinates and controls UIM242 controllers in the network.

With UIM2501, users do not need know CAN bus protocol well, but can benefit from those advantages of CAN bus, such as high speed(1Mbps), long distance(10km), and hing noise immunity. At the same time, the simple communication interface of RS232 protocol can help users focus on the application, to improve development efficiency.

UIM2501 supports 57600 bps RS232 baud rate. The instruction takes less than 2ms (0.002s) to transfer from user machine to UIM242XX. The baud rate can be set by user instruction.

UIM2501 supports 1Mbps CAN communication speed. After optimization, all UIM242 instructions take less than 0.1 ms (normally 0.05 ms) to transfer on the bus. CAN bit rate can be set by user instruction to adapt to different distance transmission.

UIM2501 has embedded DSP microprocessor. User device can command multiple UIM242 controllers through RS232 using ASCII coded instructions.

Instructions for UIM2501 are simple, intuitive and fault-tolerating. For example, in order to command a node ID of 6, the following instructionas are all valid: "SET6；" "SET=6；" "SET:6；" or "SET 6；" even "SET%?&%*6；". In case that a wrong instruction is entered, the controller will return an ACK of error message. Incorrect instructions will not be executed to prevent accidents.

UIM2501 accepts a wide range input voltage from 6 to 40VDC.

UI Robot provides free Microsoft Windows XP bases VB / VC demo software and their source code to facilitate the quick start of user device side programming.

## 1.1 Instruction and Feedback Structure

As a protocol converter, UIM2501supports all instructions and conform to all instruction and feedback structures of UIM242XX and UID820/828. Therefore, this information is omitted in this manual. User can refer to the UIM242 and UID820/828 User Manuals for details.

## 1.2 Motor and I/O Control Functions and Instructions

Motor control specific functions, instructions and operations are directly performed by the UIM242 controllers. Digital I/O functions are performed by UID820/828. As a CAN/RS232

converter, UIM2501 accepts all the instructions described in the UIM242 and UID820/828 User Manuals. User can refer to the UIM242 and UID820/828 User Manuals for detailed information.

# 2.0 RS232 COMMUNICATION

Through one CAN-RS232 converter (the UIM2501), user device can command multiple UIM242 controllers through RS232 using ASCII coded instructions. The UIM2501 translates the instructions from RS232 to CAN2.0B and sends the instructions to the target controller according to the controller ID that has been specified by user device.

UIM2501 is small in size, and it is usually installed close to the user device (less than 1 metre), therefore, it has good communication effect and high-speed. The transfer time is ahout 1ms (0.001s) when the baud rate is 57600. Meanwhile, it takes only 50 ~ 100ms for Simple CAN (custom made by UIrobot) to transfer an instruction. This can ensure the real-time of the control system.

UIM2501 controller communicates and exchanges information with user devices through the RS232 serial protocol. The RS232 configuration of user device, the hand-shaking methods, and the instruction used to change the baud rate will be introduce in this Chapter, along with the method to reset the baud rate to factory default.

## 2.1 Settings for User Device RS232 Port

To communicate with UIM242XX, user device needs to have following RS232 port settings:

- 8 bits data;
- 1 stop bit;
- None Parity;

## 2.2 Hand-Shaking

Any out-of-box UIM2501 controller has a factory default baud rate 9600. User can use the 9600 baud rate to connect to a new UIM2501 controller.

If the baud rate has been changed, the new baud rate will be stored in the controller's non-volatile memory (EEPROM). New baud rate will take effect after the controller is restarted. If user device knows the baud rate, it can start sending instructions without hand-shaking.

Hand-shaking is more used as a method to check the existence and firmware version of the controller. Under following two situations the UIM2501 will issue the greeting message.

when UIM2501 is powering up, and

When UIM2501 receives following ASCII instruction: ABC; (case sensitive and ended with a semicolon).

Hand-shaking is considered successful, if the user device receives a greeting message starting with a message header of AA, AB, AC.

The greeting message from UIM2501 has the following structure:

| *Byte* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Value | AA | AB | AC | 19 | 01 | 00 | 00 | Firmware Version | | | 00 | 00 | FF |

Where,

**AA AB AC** denotes the greeting message

**19 01** denotes the UIM2501 controller.

**[Firmware Version]** denotes the firmware version. Data is in 7 bits format. Conversion from three 7bits message data to a 16bits integer is illustrated in figure 5-1.

## 2.3 Reset Baud Rate to Factory Default 9600

In case that user forgets the UIM2501 baud rate and cannot establish the connection, following process can reset the baud rate to the factory default of 9600:

- Reboot the controller.
- In 10 seconds, toggle the DIP1 (DIP switch 1) for two rounds.每次间隔 1 秒左右。
- During toggling, the LED on the controller will flash. If exceed 10 seconds, please restart from the first step.
- If step 2 is successful, the LED will turn off for one second and re-lit. That indicates the baud rate has been changed to 9600 and ready to use.
- The BDRη; instruction can be used to change the baud rate from 9600 now.

## 2.4 Instruction List

The following table shows the instructions mentioned in this chapter, the detail of those instructions is descriped at the end of the document.

| Instruction | Description | Page |
|---|---|---|
| BDRη; | Set RS232 baud rate η | 19 |
| MDL; | Check the Firmware Version of UIM2501 | 33 |
| MDLη; | Check the Model / Modules / Firmware of node η | 34 |

# 3.0 CAN2.0B COMMUNICATION

UIM2501 and UIM242XX support and realize following bit rate as shown in table 3-1. In the same time, instruction is provided for user to switch between these standard communication bit rates. Purpose of changing the bit rates includes obtaining longer bus length and more stable communication. User can set the CAN network bit rate through setting the BTR (bit rate) index. The BTR switching instruction is BTR η; where,ηis the BTR index. UIM242XX and UIM2501 all have a factory default value of 1, i.e. 800Kbps / 50 m bus length. Generally speaking, every instruction and/or message takes 64 – 128 bits.

**Table3-1 CANCommunication Bit Rates**

| BTR Index | Bit Rate (bps) | Bus Length (m) |
|---|---|---|
| 0 | 1000K | 25 |
| 1 | 800K | 50 |
| 2 | 500K | 100 |
| 3 | 250K | 250 |
| 4 | 125K | 500 |
| 5 | 50K | 1000 |
| 6 | 20K | 2500 |
| 7 | 10K | 5000 |

## 3.1 Instruction List

The following table shows the instructions mentioned in this chapter, the detail of those instructions is descriped at the end of the document.

| Instruction | Description | Page |
|---|---|---|
| BTRη; | Set CAN network communication bit rate index η | 20 |
| BTR; | Check current CAN network bit rate index | 21 |

# 4.0 SINGLE AND NETWORK OPERATION

UIM242 controllers can work within a CAN network. Through UIM2501, user device can operate every UIM242 controller in the network. One UIM2501 can communicate with and control single or several UIM242 controller(s). Before operation, every UIM242 controller needs to be assigned a unique identification number (i.e., ID or address). ID is used to identify which object is the instruction send to, and where the ACK is form. Two or more UIM242 controllers with an identical ID in the network may cause the network malfunctioning.

User can change the ID by instruction.

The process of ID assignment is described in following section.

## 4.1 Controller ID Assignment Instruction（SET）

User can change the ID by instruction. Once an ID is assigned, the ID will be stored in the UIM242XX controller's non-volatile memory.

All new UIM242xx controllers have been assigned a factory default ID of 5. User can change the ID using SETη; instruction.Before assign an ID to a UIM242XX controller, please make sure the UIM2501 controller and the UIM242XX controller are connected together using the standalone operation scheme (Figure 0-3). A motor is not necessary. After the controller and UIM2501 is power on, user can change the ID using SETη; instruction.

## 4.2 Object Specify Instruction（ADR）

To operate a specific UIM242xx controller through UIM2501, user needs to use ADRη; instruction to specify the ID. Then, the fowllowing instruction will be send to the specified controller.

After the specifying the Controller ID, user can use UIM242 instructions to control the specified controller. Those instructions are provided in the UIM242 user manual.

## 4.3 Global Control

Besides the object specific operation, UIM2501 can also send commands to all subsidiary UIM242XX controllers. This process is called broadcasting or global control instruction. At some situation, user need to operate all controllers, for example, make all controllers stop at the same time. Especially in an emergency situation, the gOFF; instruction can stop all motors, then an accident can be avoid.

**Global Instruction Format**

Global control instructions have the same format as shown below: a leading "g" followed by the normal one-to-one operation instruction.

**gXXX;**

Where,

**g** denotes the global control instruction.

**XXX** is the object specific operation instructions, e.g., ACR, OFF, etc.

**Global Instruction ACK Message**

Except the instruction **gREG, BTR**, all global instructions have the same ACK message as shown below:

**AA [QTY] AD FF**

Where,

**[QTY]** is the quantity of all UIM242xx controllers that are operable.
**AD** is the Message ID of all global instructions.

The global instructions are list in section4.4. The details of those instructions are provided in the UIM242 user manual. Except gREG, BTR instruction, the rest ACK message are omitted in this document.

## 4.4 Instruction List

The following table shows the instructions mentioned in this chapter, the detail of those instructions is descriped at the end of the document.

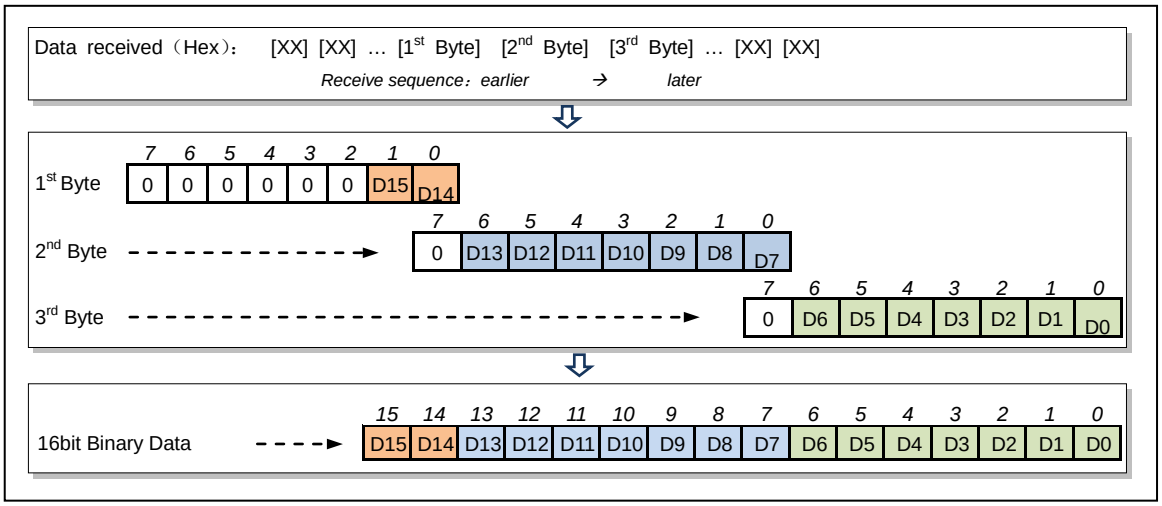
| Instruction | Description | Page |
|---|---|---|
| ADRη; | Specify the operation object by node ID η | 18 |
| gACRη; | Set the ACR function of all nodes | 22 |
| gCURη; | Set motor phase current for all nodes | 23 |
| gDOUη; | Set the TTL level output of P4 ports of all nodes | 24 |
| gMCSη; | Set micro-stepping resolution for all nodes | 25 |
| gOFF; | Disable the H-Bridge of all nodes | 26 |
| gORG; | Set Original Point of all nodes | 27 |
| gPOSη; | Setup absolute position control for all nodes | 28 |
| gQECη; | Setup encoder based position control for all nodes | 29 |
| gREGη; | Record the quantity of all subsidiary nodes and IDs | 30 |
| gSPDη; | Set motor speed for all nodes | 31 |
| gSTPη; | Setup relative position control for all nodes | 32 |
| SETη; | Assign an ID | 35 |

# 5.0 INSTRUCITON

This chapter describes the detail of the instructions mentioned in this document.

As a protocol converter, UIM2501supports all instructions and conform to all instruction and feedback structures of UIM242XX and UID820. Therefore, this information is omitted in this manual. User can refer to the UIM242 and UID820 User Manuals for details.

**Figure5-1: Conversion from three 7bits message data to a 16bits data**



## 1. ADRη Specify the operation object

**Format:** ADRη;

**Description:** Specify the object for UIM2501 by ID η.

η = 5, 6, 7, ⋯, 125;

**ACK:** AA [Controller ID] D0 FF

**Command:** D0 >> Message ID of ADR

**Note:** Once an operation object is specified,
all object specific instructions will be sent to this specified object (the UIM242xx Controller), UNTILL another operation object (new ID) is specified. After specify object, user can control the corresponding controller through UIM242 instruction.

## 2. BDRη Set RS232 BaudRrate

**Format:** BDRη;

**Description:** Set RS232 BaudRrate

η = 9600, 19200, 38400, 56000;

Other value of baud rate is also available, but it must be integral multiple of 100.

**ACK:** AA [Reserved] BD FF

**Command:**

| | | |
|---|---|---|
| [Reserved] | >> | Factory use; |
| BD | >> | Message ID of instruction BDR. |

**Note:** The new baud rate will be stored in the controller's non-volatile memory (EEPROM). New baud rate will take effect after the controller is restarted.

## 3. BTRη Set CAN network bit rate

**Format:** BTRη;

**Description:** Set CAN network bit rate index η.

η = 0, 1, 2, ⋯, 7;

**ACK:** AA [BTR#] BC FF

**Command:** [BTR#] >> Desired bit rate index;

BC >> Message ID of instruction BTR.

**Note:** After fulfills the "BTRη;" instruction, the UIM2501 will automatically perform global registration process, i.e. process "gREG" instruction, and return ACK message. Details can be found in the following section of "gREG" instruction.

## 4. BTR Check CAN network bit rate

**Format:** BTR;

**Description:** Check current CAN network bit rate index.

**ACK:** AA [BTR#] BC FF

**Command:** Refer to BTRη; ACK command.

## 5. gACRη Set Automatic Current Reduce

**Format:** gACRη;

**Description:** Set the automatic current reduce rate η for all controllers.

η = 0,1,⋯,99。

η = 0, shut off automatic current reduce.

η = 1, automatic current reduce rate is 50%.

η = 2,3,⋯,99, automatic current reduce rate is 2,3,⋯,99%.

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

**Note:** When ACR is enabled, the current will be reduced after motor stops, which means a decrease of holding torque. Value of this instruction will be stored in EEPROM.

For only 1232 version controller, η can be set to 2,3,⋯,99.

## 6. gCURη Set current

**Format:** gCURη;

**Description:** Set motor phase current for all nodes.

η = 0,1,…,80。

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 7. gDOUη Set the TTL level output

**Format:** gDOUη;

**Description:** Set the TTL level output of P4 ports of all nodes

η = 0, 1

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 8. gMCSη Set micro-stepping resolution

**Format:** gMCSη;

**Description:** Set micro-stepping resolution for all nodes

η = 1,2,4,8,16（integer）;

η = 1, 2, 4, 8, 16 represents the full, half, quarter, eighth and sixteenth step resolution, respectively.

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 9. gOFF Disable the H-Bridge

**Format:** gOFF;

**Description:** Disable the H-Bridge of all nodes.

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

**Note:** User can shutdown all motors using this instruction, especially in an emergency.

## 10. gORG Set origin point

**Format:** gORG;

**Description:** Clear absolute position counters (including encoder) of all nodes

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 11. gPOSη Set absolute position

**Format:** gPOSη;

**Description:** Setup absolute position control for all nodes

η = - 2,000,000,000…-1, 0, 1 … + 2,000,000,000;（integer）

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 12. gQECη Set closed-loop encoder based position

**Format:** gQECη;

**Description:** Setup closed-loop encoder based position control for all nodes

η = - 2,000,000,000…-1, 0, 1 … + 2,000,000,000;（integer）

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 13. gREG Global register

**Format:** gREG;

**Description:** Record the quantity of all subsidiary UIM242 controllers and their IDs

**ACK:** CC [On-line ID] D0 [A1] [A2] [A3] [A4] [A5] [A6] [A7] [A8] FF

**Command：** D0 >> Message ID of gREG;

[A1] ~ [A8] >> Received data 1 ~ 8。

[A1] ~ [A8] are the first 8 IDs found. An = 0 means not found.

**Note:** The returned QTY servers as an indicator of the health of the network.

## 14. gSPDη Set motor speed

**Format:** gSPDη;

**Description:** Set motor speed for all nodes

η = - 65000…-1, 0, 1 … + 65000;（integer）

**ACK:** AA [Controller] AD FF

**Command:** AD >> Message ID of global instruction.

## 15. gSTPη Set relative position

**Format:** gSTPη;

**Description:** Setup relative position control for all nodes

η = - 2,000,000,000…-1, 0, 1 … + 2,000,000,000;（integer）

**ACK:** AA [Controller ID] AD FF

**Command:** AD >> Message ID of global instruction.

## 16. MDL Check the firmware version of UIM2501

**Format:** MDL;

**Description:** Check the firmware version of UIM2501.

**ACK:** CC [Reserved] DE 19 01 00 00 [V0] [V1] [V2] FF

**Command:** DE >> Message ID of instruction MDL;

[V0] ~ [V2] >> Received data 0 ~ 2

[V0] ~ [V2] converted to a 16-bit data which denote the firmware version (Figure5-1)

## 17. MDLη Check UIM242 model and version

**Format:** MDLη;

**Description:** Check the Model, installed modules and firmware version of the UIM242 controller with ID = η

η = 5, 6,…,125。

**ACK:** CC [Controller ID] DE 18 02 [CUR] [asb] [V0] [V1] [V2] FF

**Command:**

| | | |
|---|---|---|
| DE | >> | Message ID of instruction MDL; |
| [CUR] | >> | Max phase current. e.g., “20” means 2.0 Amper. |
| [asb] | >> | The installed optional modules |
| [V0] ~ [V2] | >> | Receiced data 0 ~ 2 |

[V0] ~ [V2] converted to a 16-bit data which denote the firmware version (Figure 5-1)

[asb] has the following structure:

| *Bit* | *7* | *6* | *5* | *4* | *3* *2* *1* *0* |
|---|---|---|---|---|---|
| *Meaning* | 0 | Int.QEC | Closed-loop | Adv. Motion | No. of Sensor Ports |

For example, if bit 4 is 1, the Advanced Motion Control module is installed.

## 18. SETη Controller ID Assignment

**Format:** SETη;

**Description:** Assign an ID η to a UIM242XX controller.。

η = 0, 1, 5, 6,…, 125 , 133 , 134, …,253.

η = 0, UIM2501 will communicate with UIM242 through CAN2.0B protocol;

η = 1, UIM2501 will communicate with UIM242 through CAN2.0A protocol;

η = 5, 6, ...125, single slave, assign an ID 5,6,...125;

η = 133,134,...253, network, assign an ID 5,6,...125 to specified controller.

**ACK:** AA [Controller ID] DD FF

**Command:** DD >> Message ID of SET.

**Note:**

1、Controller ID of UIM242 can be changed by instruction. Once an ID is assigned, the ID will be stored in the UIM242XX controller's non-volatile memory.

2、All new UIM242xx controllers have been assigned a factory default ID of 5. User can change the ID using SETη; instruction. Before assign an ID to a UIM242XX controller, please make sure the UIM2501 controller and the UIM242XX controller are connected together, a motor is not necessary. After powering up, user can use the instruction to assign an ID to the UIM242XX controller.

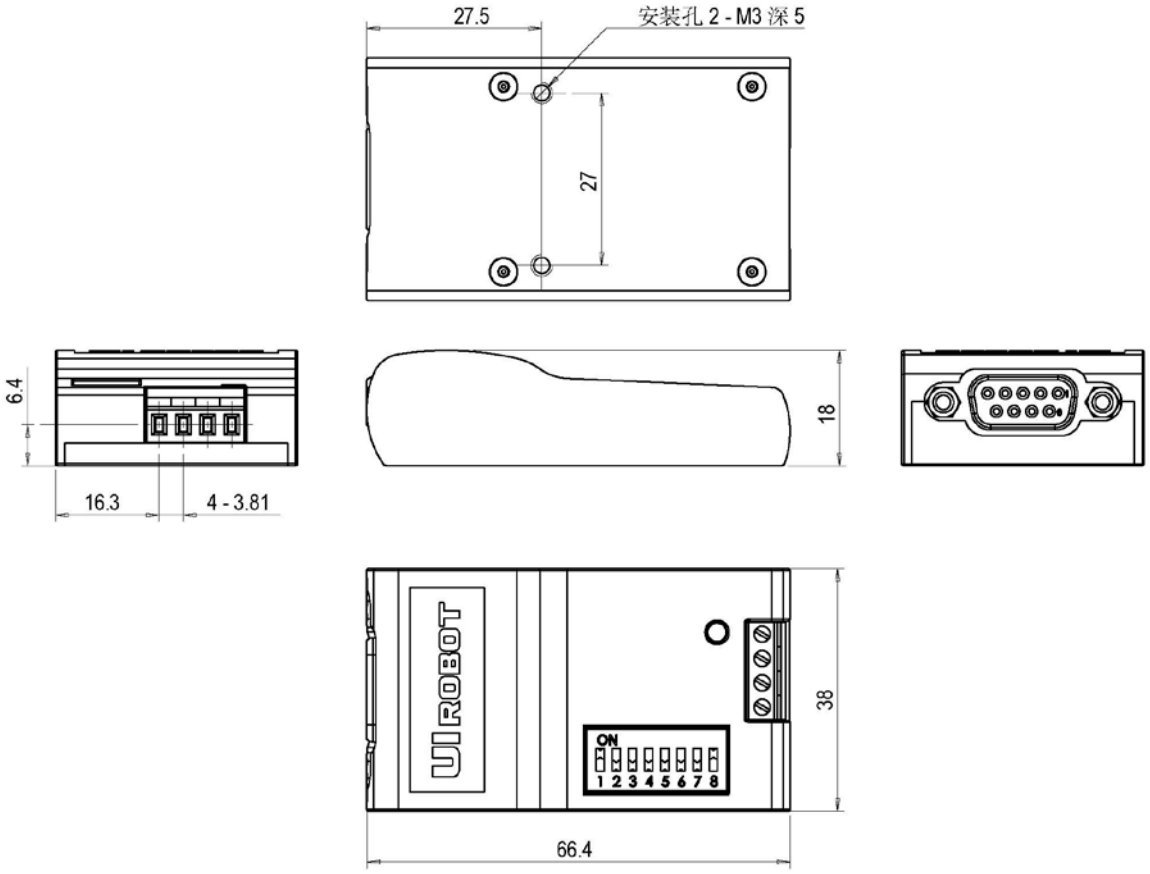
3、For only 1232 version UIM2501,η can be set to 0, 1, 133 , 134, …,253;

4、In a network, η can not be set to 5, 6, ...125, otherwise all controllers will have the same ID.

5、If user needs to change the ID of a controller in a network, a controller's ID must be specified at first, and η should be set to 133,134,...253. Futhermore, UIM2501 must be regard as a gateway in this situation.

6、Communication protocol of UIM2501 will automatic recovery to CAN2.0B when it restarts.

# APPENDIX A DIMENSIONS




Units：mm